

financial brokerage houses and other large firms requiring diverse paths to carry their traffic.⁵⁰

Continental Cablevision, Cablevision of Boston, and Time Warner Cable: The three Boston MSOs became the first cable TV companies to interconnect their systems to demonstrate how PCS could be offered over CATV systems in late 1993. The demonstration allowed the MSO's to overcome their problems with interconnecting with differing systems and offering telecommunications subscribers extended and seamless service by using a combination of technology and cooperation. The companies had to do very little to their basic cable infrastructure to offer wireless services and to bypass the local telephone company.⁵¹

Monmouth Cablevision, Adelphia Cable, and Comcast Cable Communications: The three cable operators in Central New Jersey began setting up an inexpensive fiber interconnect in 1993 through a joint venture that will open new business opportunities for them such as alternative access to long distance services. Each company expects its cost for the interconnect to be less than \$50,000.⁵²

Continental Cable and Hyperion: The MSO and the telecommunications subsidiary of Adelphia agreed to set up a metropolitan area network through a joint venture in Jacksonville, Fla. The network will utilize Continental's existing fiber backbone and will require some construction of a series of fiber rings and fiber hookups to the premises of potential users. Between 30 and 40 large business users have been identified as likely connection points for the operation.⁵³

Continental Cable and Teleport: The MSO and CAP began building loops around greater Boston and in the Willshire corridor of Los Angeles through a joint venture since 1992. TCG has been able to extend its business beyond the city limits via fiber routes available over Continental's suburban systems, allowing the MSO to enter the business without devoting a tremendous amount of startup effort.⁵⁴

Comcast and Eastern Telelogic: Comcast agreed to acquire a 51% stake in the CAP in July, 1992 and subsequently expanded the CAP's operations in Philadelphia.⁵⁵ Terms of the deal were not disclosed.

⁵⁰ "In Teleport's Shadow," *Cablevision*, September 21, 1992.

⁵¹ "CATV networks join to offer PCS," *Telephony*, November 22, 1993, p.8.

⁵² "RBOCs? Who Needs RBOCs?" *Cablevision*, December 6, 1993.

⁵³ "In Teleport's Shadow," p.31.

⁵⁴ "In Teleport's Shadow," p.31.

⁵⁵ "In Teleport's Shadow," p.31.

Continental, Adelphia Communications and possibly Maclean Hunter Cable Television and Comcast Corp.: The three MSO's concluded a deal in 1992 to establish a CAP network in Palm Beach County, Fla.⁵⁶

ii. *Cable/Telco relationships:*

US West/Time Warner, Inc.: The RBOC bought a 25% stake in the MSO through \$2.5 billion in cash and notes in December of 1993. Roughly \$1 billion of US West's investment was targeted to accelerate the building of full-service networks on Time Warner Cable systems in 25 major metropolitan areas. The two companies will share equally in the design, implementation, and direction of the full-service networks, which will accommodate a wide range of services including telephony. The two firms have combined sales of over \$32 billion.⁵⁷

BellSouth/Prime Management: The RBOC announced a \$250 million investment to buy 22.5 percent of the nation's 23rd largest cable operator in October, 1993, to pursue interactive media and telecommunications opportunities, including alternate phone service for business and residential customers. Prime manages cable TV systems with more than 500,000 customers.⁵⁸

Southwestern Bell/Hauser Communications: Southwestern Bell purchased cable franchises in Arlington County, Virginia and Montgomery County, Maryland from Hauser Communications. This acquisition makes it possible for Southwestern Bell to gain access to Bell Atlantic local service customers through the cable companies' facilities. The Arlington County and Montgomery franchises serve over 200,000 households.

iii. *IXC/Other:*

AT&T/McCaw: The IXC announced a \$12.6 billion plan to acquire the cellular provider, which competes directly with BOC cellular subsidiaries in August of 1993. McCaw had pieced together rights to spectrum capable of carrying voice and data to create the nucleus of a seamless network stretching from Florida to the Pacific Northwest since 1991. A factor in the IXC's bid was that the cellular provider owned more than 50% of LIN, a wireless communications and broadcasting conglomerate. McCaw had an option to buy the remainder of LIN but did not have the funds to do so - until AT&T came along. The three firms have combined sales of

⁵⁶ "In Teleport's Shadow," p.31.

⁵⁷ "US West's Deficit Spending," *Cablevision*, February 28, 1994, & *Edge*, May 24, 1993.

⁵⁸ *State Telephone Regulation Report*, October 21, 1993.

over \$82 billion.⁵⁹ The deal is still pending while waiting for approval of an AT&T request for a waiver of the MFJ.

MCI/Western Union: The IXC purchased underground conduits laid by Western Union Advanced Transmission Services for less than \$30 million in 1990. MCI has announced new plans to offer alternative access services. Parts of MCI's \$2 billion planned alternative to the local phone networks will be built using the Western Union conduits as the backbone of a network for more than 2,000 buildings in more than 200 cities.⁶⁰

MCI/British Telecom: The British telephone provider agreed to invest \$4.3 billion for a 20% stake in the IXC in June, 1993. MCI has used \$800 million of the investment to pay down debt and has the ability to use the remainder for whatever it pleases. MCI is creating MCI Metro, a wholly-owned subsidiary that will invest in switching equipment needed to provide local phone services without going through the regional Bell systems. In late 1992, MCI organized a consortium of more than 250 cable, CAP, and independent local phone companies to develop a national PCS network. MCI reportedly intends to spend \$10 billion over the next decade to build a PCS system that will cover 90 percent of the population. The two companies have combined revenues of \$30.4 billion.⁶¹

MCI/Nextel: MCI announced plans to spend \$1.3 billion to buy 17 percent of Nextel, which is developing local digital wireless service, in March, 1994. The service is expected to be integrated with Network MCI, the company's multimedia communications venture. MCI plans to offer the digital wireless service in the nation's top 10 markets within a year. The two firms have combined sales of over \$18.6 billion.⁶²

MCI/Jones Cable/Bell Canada: In December 1993, Bell Canada announced plans to pay \$400 million for 30 percent of Jones Intercable, with an option to gain a controlling interest within the next eight years.⁶³ MCI has recently announced that it plans to test phone service over the Jones cable network in Alexandria, Virginia.

⁵⁹ Bear, Stearns & Co., Inc., Company Report No. 1157367, McCaw Cellular, December 27, 1991, "Speculating on Spectrum," *Cablevision*, September 20, 1993 & "Mega-merger Mania," *Network World*, October 25, 1993.

⁶⁰ "Old Tubes for MCI," *The New York Times*, Wednesday, January 5, 1994.

⁶¹ "MCI Unveils Its Plan to Upgrade Networks and Battle Baby Bells," *Wall Street Journal*, January 5, 1994 & "Old Tubes for MCI," *New York Times*, Wednesday, January 5, 1994.

⁶² "Cable Deal is Possibility: MCI Goes for 'Now' Wireless Technology for Nationwide Network," *Communications Daily*, March 1, 1994.

⁶³ *The Geodesic Network II*, 1992, p.26.

iv. *Wireless:*

TCI/McCaw Cellular: The MSO and cellular provider tested PCS through a joint venture in Ashland, Oregon in 1992. None of the test customers were cellular subscribers, and the most popular of the two services McCaw and TCI offered was one that essentially copied cellular service by letting people make phone calls from anywhere in town. Sources say the test indicates that a two-way PCS extension of cellular substantially improves cellular's overall revenue performance.⁶⁴

McCaw Cellular Corp./GTE Corp. Roaming Agreements: The two cellular providers have negotiated roaming agreements, which pertain to the tracking and billing of cellular services for users who are outside their carrier's service area. McCaw said it would activate Cellular Digital Packet Data (CDPD) services, which allow for high speed data transmission, in 105 major cities by the end of 1994. GTE and allied companies such as Ameritech and Bell Atlantic will provide local CDPD service to 77 cities by year end.⁶⁵

McCaw/Microsoft: In 1990, Teledesic Corporation began a partnership with the cellular provider to set up a network of hundreds of satellites for worldwide communications. McCaw had the clout to arrange the international partnerships such a concept would require and to finance the construction and launching of 840 satellites. McCaw bought a 27.8% stake for \$3.7 million. The seed capital went to hire engineers to develop detailed specifications. In early 1994, with the FCC deadline to file for the required 28-gigahertz radio band nearing, Teledesic needed more cash and contacted Microsoft chairman Bill Gates. Microsoft and McCaw each put up \$5 million for 30% stakes.⁶⁶

Microsoft/Wireless: Bill Gates agreed to invest \$30 million of Microsoft's money, and \$10 million of his own, in Nationwide Wireless Network, Inc., a \$150 million joint venture with Mobile Telecommunications Technologies Corp., to build a giant messaging service in early 1994.⁶⁷

As is demonstrated above, AT&T, MCI and Teleport have created ventures that together represent a potent competitive force in telecommunications services. Figures B-9a & B-9b illustrate the potential ability of AT&T and MCI to provide end-to-end services to consumers, whether it be information transmitted by PCS, cellular telephony, cable, or fiber optics. These cooperative relationships have special competitive significance when they involve, as they often do, complementary assets and resources. The AT&T-based alliance spans telecommunications equipment and

⁶⁴ "PCS Test Spots," *Cablevision*, March 22, 1993 & "From Blueprint to Reality," *Cablevision*, November 16, 1992.

⁶⁵ "GTE to Join McCaw in Cellular Rollout," *InfoWorld*, November 22, 1993.

⁶⁶ "He's No Mere Satellite-Gazer," *Business Week*, April 4, 1994.

⁶⁷ "He's No Mere Satellite-Gazer."

services, and wireline and wireless telecommunications services. It has enormous financial, human and technical resources and one of the best known name brands in the US. The BT-MCI based alliance includes global and domestic interexchange services, cable and wireless interests and strong relationship with many competitive access providers. MCI is, by itself, a \$10.5 billion company, but in addition has access to the huge financial resources of BT (formerly British Telecom).

As shown in Figure B-9c, Teleport is a joint venture owned by the nation's largest cable MSOs (multiple system operators). In addition to providing competitive access services and, soon, exchange services, Teleport is clearly being positioned as a means of interconnecting cable systems in metropolitan areas, enhancing the viability and attractiveness of regional cable networks. Teleport thus illustrates a fundamental point in assessing competition in telecommunications services. Instead of assessing only the competitiveness of a single firm or mode of communications, it is crucial to weigh the potential competition of logical combinations of the firms and modes.

d. Conclusion

Therefore, LECs, through the entry of individual firms and alliances, will be faced with ever increasing competition for telephony services. New competitors have significant financial and physical assets with which to effectively compete. This competition will encompass the full range of services currently provided by LECs, as well as the new services made possible by ongoing technological change in the provision of telephony services.

Table B-1:
LEC 1992 Operating Revenue by Type of Service

(\$ millions)	Local Service	Long Distance	Network Access	Other	Total
Ameritech	5,012	1,252	2,654	2,235	11,153
Bell Atlantic	4,892	1,556	2,953	3,246	12,647
BellSouth	6,236	1,249	3,817	3,899	15,201
GTE	5,000	3,396	4,477	2,989	15,862
NYNEX	6,308	1,113	3,356	2,378	13,155
Pacific Telesis	3,377	2,103	2,250	2,205	9,935
Southwestern Bell	4,668	1,012	2,548	1,788	10,016
US West	3,674	1,420	2,720	2,467	10,281
Totals:	39,167	13,101	24,775	21,207	98,250

Network Access as a % of Total Operating Revenue

Ameritech	23.8%
Bell Atlantic	23.3%
BellSouth	25.1%
GTE	28.2%
NYNEX	25.5%
Pacific Telesis	22.6%
Southwestern Bell	25.4%
US West	26.5%
 Total	 25.2%

Source: Company Annual Reports

Table B-2:

Business Revenues Generated by Land Area in Ten Large States

% of Business Revenues	% of Land Area
10%	0.05%
20%	0.6%
30%	1.1%
40%	2.1%
50%	3.2%
75%	8.0%

Source: InContext Inc.

Figure B-2a

Business Telephone Revenues

Washington



U S West provides affordable, universal service across most of Washington. Map shows in red the 0.1% of land area that provides 30% of business revenues. Profits from the few high-density areas support low rates across the rest of the state.

Business Revenue











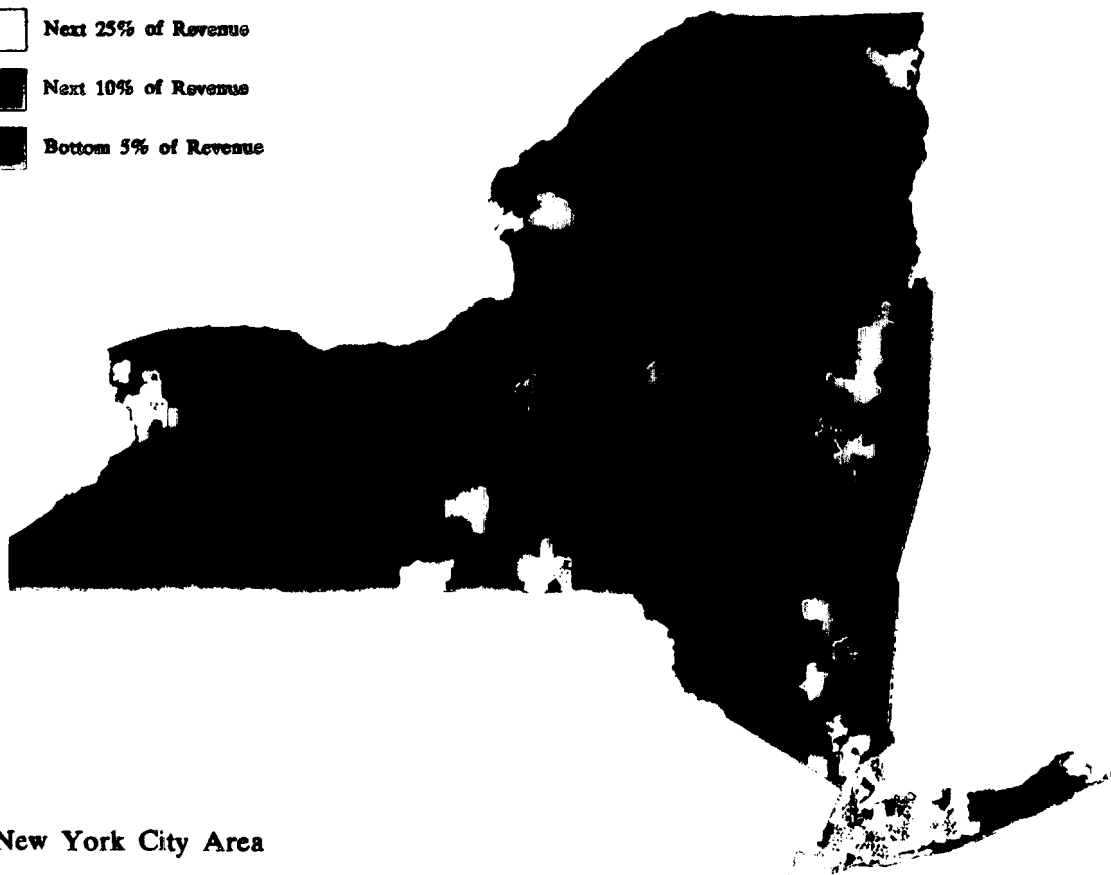
-  Top 30% of Revenue
-  Next 30% of Revenue
-  Next 25% of Revenue
-  Next 10% of Revenue
-  Bottom 5% of Revenue

Figure B-2b

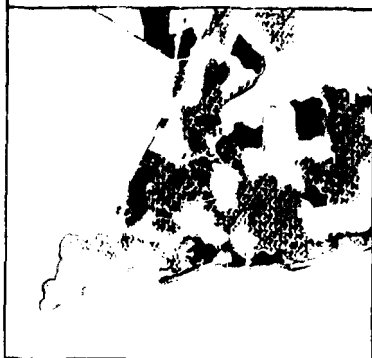
Distribution of New York Telephone Business Call Revenues

Business Revenue Concentrations

-  Top 30% of Revenue
-  Next 30% of Revenue
-  Next 25% of Revenue
-  Next 10% of Revenue
-  Bottom 5% of Revenue



New York City Area



Map shows in red the 0.3% of land area that provides 30% of business revenues. Reduced phone rates for blue and green areas depend on contributions from red areas.

Figure B-2c

Business Telephone Revenues California

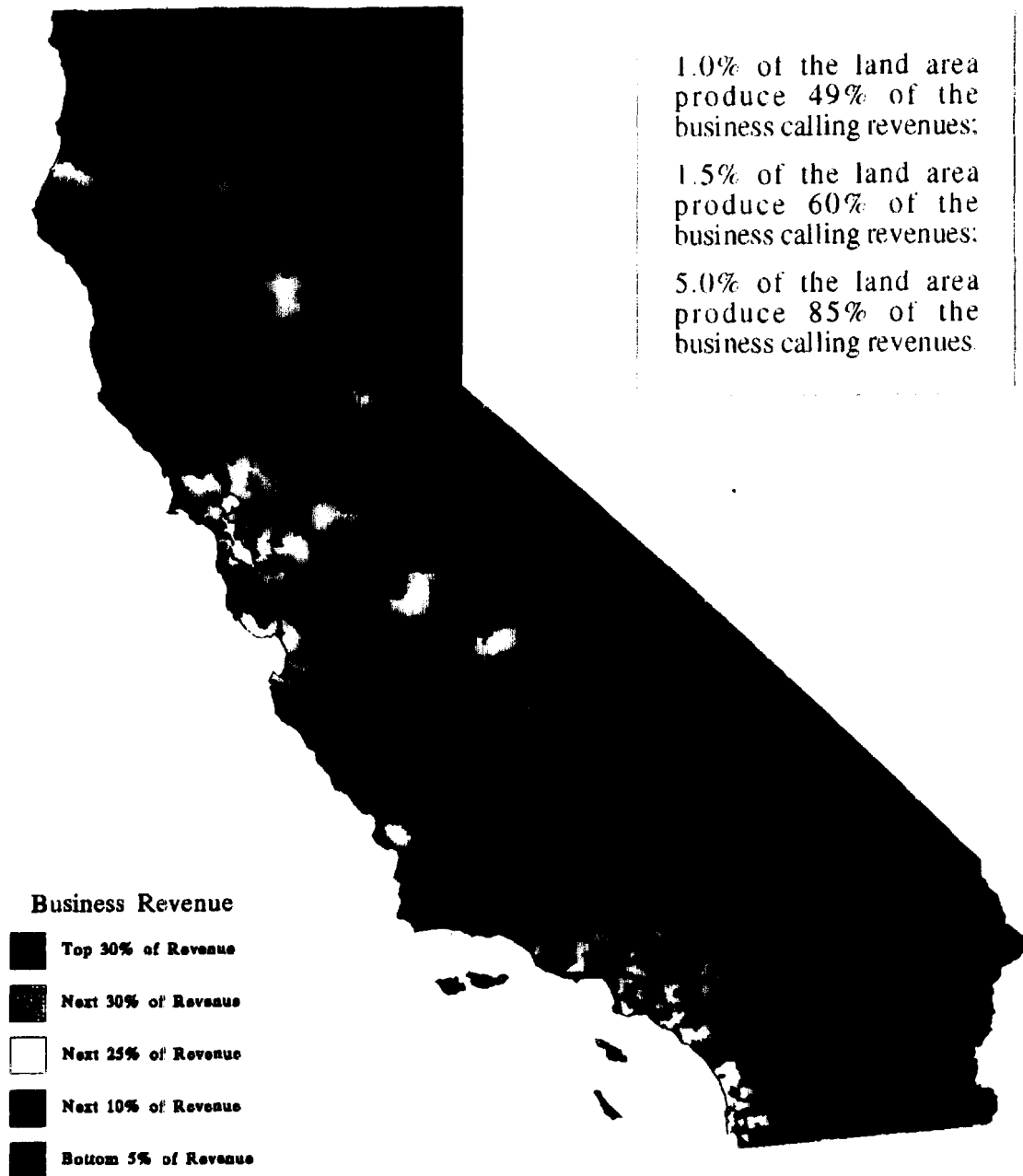


Table B-3:
Markets Served by MFS and Teleport

	MFS	Teleport
Current	19	13
Planned	11	5
Total	30	18

Sources: The Yankee Group, 1993; Telco Competition Reports
Calls to State PUCs/PSCs, CAP Promotional Materials,
Local Competition and Regulation, Geodesic Network II

Table B-4: CAP Market Summary by City

(Operational CAP networks as of April 1994)

State	City	CAP
Alabama	Andalusia	Deltacom
	Birmingham	Metrex
	Dothan	Deltacom
	Huntsville	Metrex
	Ozark	Deltacom
Arizona	Phoenix	IntelCom Group
		City Signal
		Teleport
		Electric Lightwave
California	Anaheim	Linkatel
	Los Angeles	Linkatel
		MFS
		Teleport
		IntelCom Group
		ACLA
	Los Gatos	Bay Area Transport
	Mid-Wilshire	Linkatel
	Morgan Hill	Bay Area Transport
	Navota	Linkatel
	Rancho Cordova	Phoenix Fiberlink
	Sacramento	Electric Lightwave
		IntelCom Group
		Digital Direct
		Phoenix FiberLink
		Teleport
	San Diego	Linkatel Communications
		Electric Lightwave
		Time Warner AxS
		Fibrcom
		MFS
	San Francisco	Teleport
		IntelCom Group
		MFS
	San Jose	IntelCom Group
		MFS

Table B-4: CAP Market Summary by City

(Operational CAP networks as of April 1994)

State	City	CAP
California (cont.....)	Santa Barbara	Wiltel SP Telecom
	Santa Monica	Linkatel IntelCom Group ACLA
Colorado	Boulder	IntelCom Group
	Colorado Springs	IntelCom Group
	Denver	IntelCom Group Jones Lightwave MFS
	Fort Collins	IntelCom Group
	Pueblo	IntelCom Group
Connecticut	Hartford	MFS
	Menden	American Lightwave
Delaware	Wilmington	Delaware Lightwave (MFS)
District of Columbia	Washington, D.C.	MFS LOCATE
Florida	Clearwater	Florida Digital Media Partners
	Hillsborough	Tampa Electric Company
	Jacksonville	AlterNet Intermedia Hyperion Telecom
	Manatee	Tampa Electric Company
	Melbourne	FiberCap
	Miami	MFS Teleport Intermedia
	Orlando	Intermedia Time Warner AxS
	Sarasota	Tampa Electric Company

Table B-4: CAP Market Summary by City

(Operational CAP networks as of April 1994)

State	City	CAP
Florida (cont.....)	St. Petersburg	Jones Lightwave Wiltel Paragon Cable Florida Power Corp. Intermedia
	Tampa	Jones Lightwave Tampa Electric Company MFS Intermedia
Georgia	Atlanta	Jones Lightwave MFS
	Augusta	Jones Intercable
	Manatee/Hillsboro	Jones Intercable
Hawaii	Honolulu	State of Hawaii (with Oceanic Cable)
	Oahu	State of Hawaii (with Oceanic Cable)
		Digital Transport
Illinois	Chicago	MFS
		Teleport
		LOCATE
		United Communications Systems
Indiana	Indianapolis	MFS
		City Signal
		Indiana Digital Access
	Terre Haute	Indiana Digital Access
Iowa	Cedar Rapids	MCLEOD Telemanagement
	Des Moines	MWR Telecom
	Iowa City	MCLEOD Telemanagement
Kansas	Wichita	Multimedia Hyperion

Table B-4: CAP Market Summary by City

(Operational CAP networks as of April 1994)

State	City	CAP
Kentucky	Glasgow	Municipal Government Glasgow, KY
	Lexington	Quest Engineers, Inc.
	Louisville	Americall
Louisiana	New Orleans	Two Way Com LA FiberNet MFS
Maryland	Baltimore	Baltimore G & E MFS LOCATE
Massachusetts	Boston	MFS Teleport LOCATE
	Cambridge	MFS Teleport
	Springfield	Brooks FiveCom
Michigan	Ann Arbor	City Signal Access Transmission
	Detroit	Teleport Access Transmission U.S. Signal LOCATE
	Grand Rapids	City Signal
	Lansing	City Signal City Signal
Minnesota	Minneapolis-St. Paul	MFS FibrCom Continental Cable

Table B-4: CAP Market Summary by City
(Operational CAP networks as of April 1994)

State	City	CAP
Missouri	Independence	K.C. FiberNet
	Kansas City	K.C. Fibernet MFS
	Springfield	Springfield Fibernet
	St. Louis	TCG America MFS F.A.S.T. Teleport
Nebraska	Kearney	Cable One
	Omaha	Teleport
Nevada	Las Vegas	Electric Lightwave
		City Signal
		Community CATV of L.V.
New Jersey	Camden	Eastern Telelogic
	Newark	MH Lightnet MFS Teleport LOCATE
New Mexico	Hobbs	Eastern New Mexico Co-op
New York	Albany	MFS
	Buffalo	MFS
	Long Island	Cablevision
	New York	MFS Teleport LOCATE Cablevision Lightpath Time Warner AxS
	Rochester	MFS
	Syracuse	Hvperion MFS

Table B-4: CAP Market Summary by City**(Operational CAP networks as of April 1994)**

State	City	CAP
North Carolina	Charlotte	IntelCom Group Time Warner AxS
	Raleigh-Durham	Time Warner AxS FibrCom
Ohio	Akron	IntelCom Group MetroComm AxS
	Cincinnati	Ohio Linx Western Union
		IntelCom Group Time Warner AxS
	Cleveland	MFS MetroComm AxS
		IntelCom Group
	Columbus	MetroComm AxS
	Dayton	IntelCom Group
	Medina	Ohio Linx
	Toledo	IntelCom Group
Oklahoma	Broken Arrow	Public Service of Oklahoma/Metrolink
	Oklahoma City	Dobson Fiber Cox Cable
	Tulsa	PSO Metrolink Public Service of Oklahoma/Metrolink
Oregon	Portland	Electric Lightwave Pac-Net
Pennsylvania	Carlisle	ValleyNet
	Chambersburg	ValleyNet
	Philadelphia	MFS Eastern Telelogic
	Pittsburgh	TCI/Penn Access MFS
	Stephens City	ValleyNet

Table B-4: CAP Market Summary by City**(Operational CAP networks as of April 1994)**

State	City	CAP
Rhode Island	Providence	Teleport
		FiveCom
South Carolina	Charleston	PalmettoNet
	Charlotte	MPX Inc.
	Columbia	MPX Inc.
	Florence	PalmettoNet
	Myrtle Beach	PalmettoNet
	Savannah	PalmettoNet
	St. George	PalmettoNet
	Sumter	PalmettoNet
	Waterboro	PalmettoNet
	Yemassee	PalmettoNet
Tennessee	Louisville	IntelCom Group
	Memphis	City Signal
		Time Warner AxS
Texas	Austin	Time Warner AxS
	Dallas	Phonoscope
		Fibercom/Paragon Cable
		MFS
		Teleport
	Houston	Phonoscope
		Fibercom/Paragon Cable
		Time Warner AxS
		MFS
		Teleport
		Houston Power & Light
	League City	Houston Light & Power
	Nassau Bay	Houston Light & Power
	Richmond	Hyperion Tel. Inc/Penn Access
	San Antonio	Fibercom/Paragon Cable
Utah	Salt Lake City	Questar Telecom
		Electric Lightwave

Table B-4: CAP Market Summary by City

(Operational CAP networks as of April 1994)

State	City	CAP
Virginia	Richmond	AlterNet of Va. Virginia Metrotel Inc.
Washington	Kennewick	Northwest Microwave
	Seattle	Digital Direct Teleport Electric Lightwave PacNet MFS
	Spokane	Electric Lightwave
	Wenatchee	Northwest Microwave
Wisconsin	Kenosha-Racine	Teleport
	Milwaukee	Teleport

Sources: Connecticut Research (1994), The Geodesic Network II (1992),
The Yankee Group Report (1992), Telco Competition Report (various dates),
Local Competition and Regulation (1993)

Figure B-4a

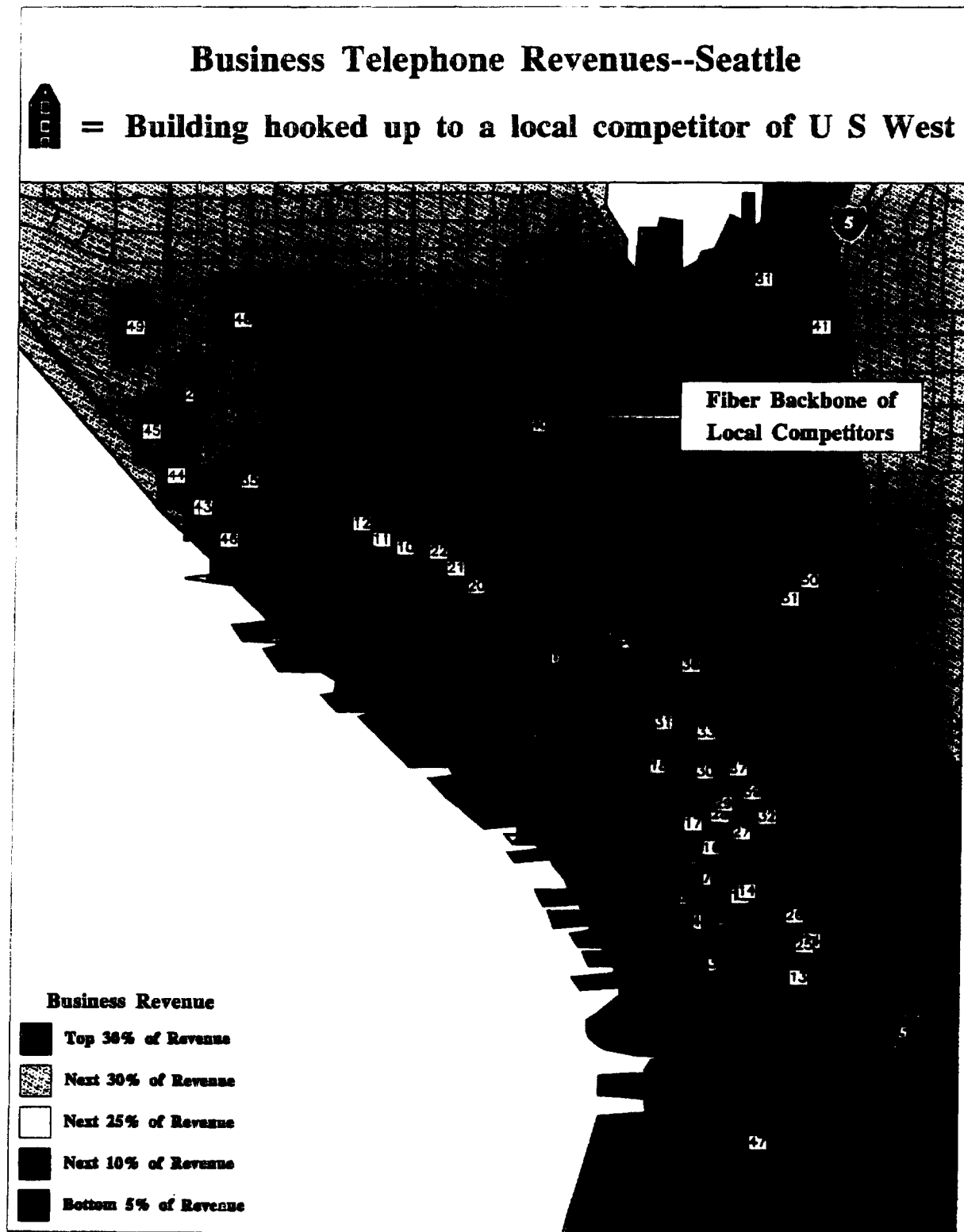


Figure B-4b

THE CAP'S NETWORKS COMPREHENSIVELY COVER MANHATTAN...

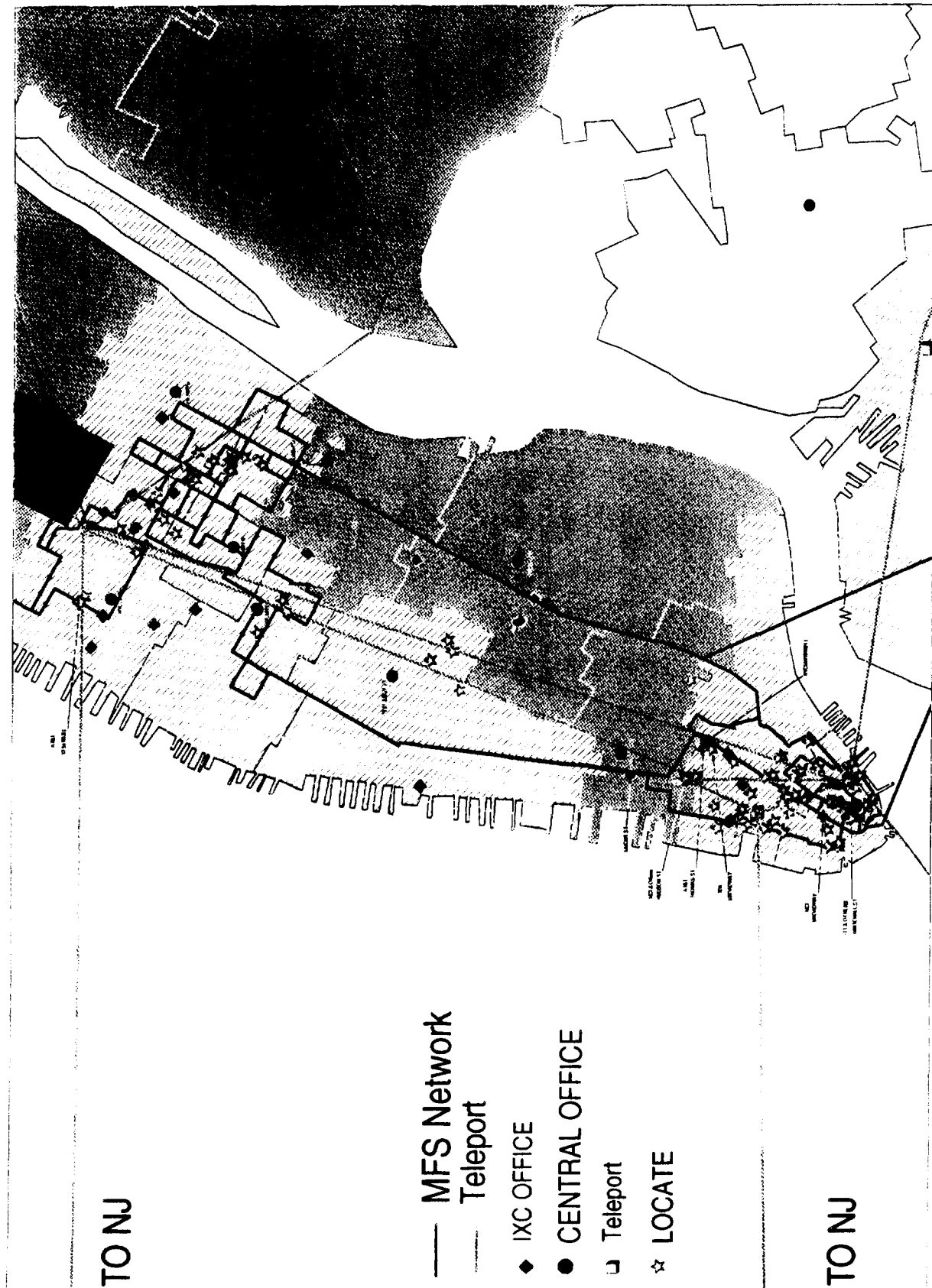


Figure B-4c

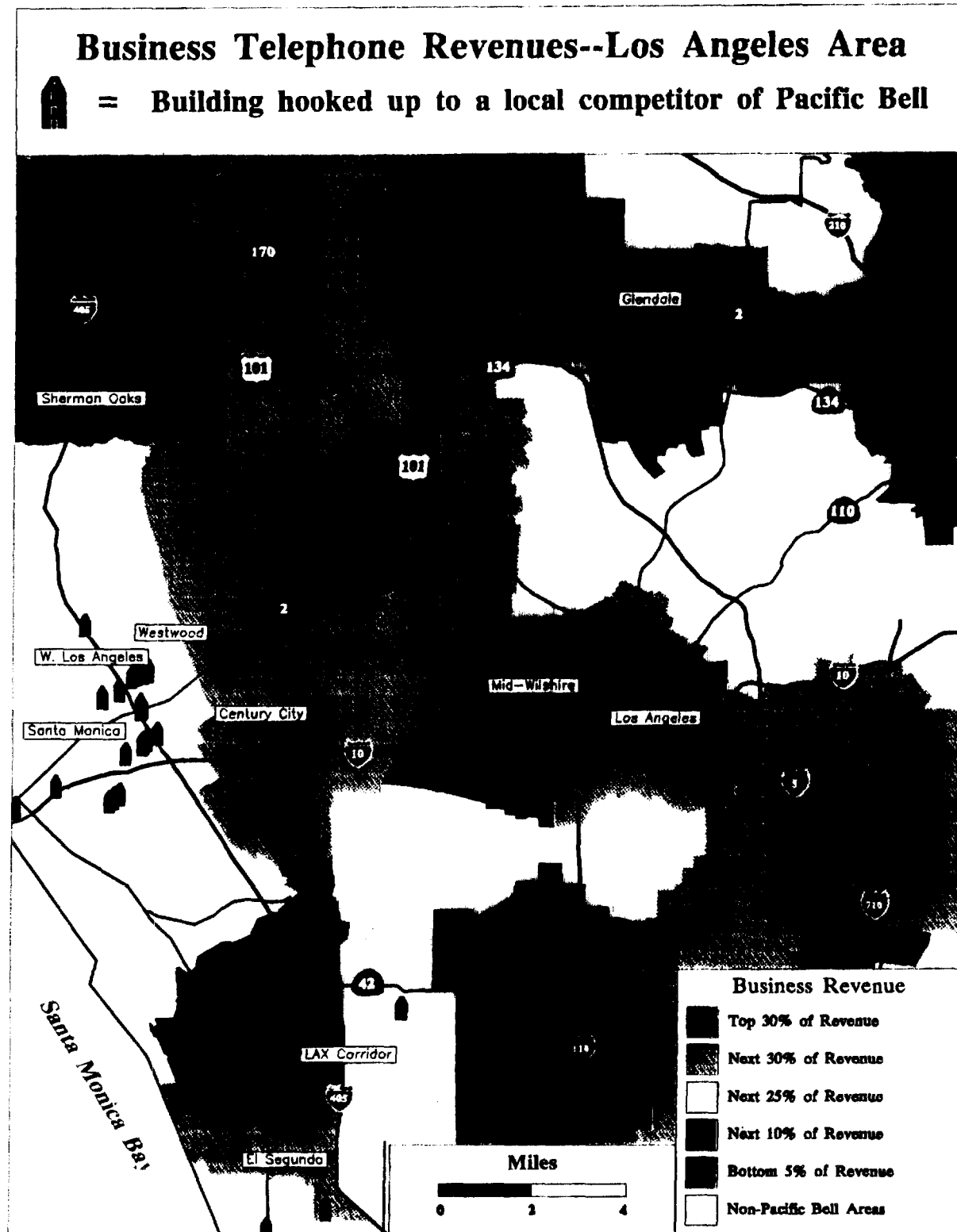


Table B-5:

CAP 1992-1993 Revenue Growth by Source

Revenue Source	1992-1993 % Growth
Access	24%
Systems Integration	52%
Switched Services	400%
Other Telecom	314%
Total Revenue	43%

Source: Connecticut Research

Table B-6:
CAP 1992-1993 Revenue Growth by Company

Company	1992-1993 Growth
MFS Communications	24%
Teleport Communications Group	50%
IntelCom Group	368%
LOCATE	25%
Eastern TeleLogic Corp.	10%
Bay Area Teleport	-20%
Intermedia Communications of Florida	14%
PacNet	79%
Electric Lightwave	40%
Time Warner Communications	33%
City Signal	150%
Linkatel Communications	79%
Penn Access	50%
FiberNet	100%
PSO MetroLink	20%
Associated Communications of L.A.	67%
Metrex Communications Group	200%
MWR Telecom	50%
Phoenix FiberLink	250%
FiveCom	100%
Start Ups and Others:	100%
Totals	43%

Source: Connecticut Research

Table B-7:
PBX-Centrex Installed Base, 1986-1997*

<i>(Thousands of lines)</i>	1992	1993	1994	1995	1996	1997	CAGR
PBX	27,439	29,251	31,088	32,950	34,787	36,598	5.93%
Centrex	8,770	8,878	9,556	10,287	11,076	11,929	6.34%

* 1993-1997 are projections

Source: NATA Market Research Department